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THE DESERT COPRINUS FUNGUS *(PODAXIS PISTILLARIS)* IN WESTERN AUSTRALIA

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Few naturalists will be unfamiliar with the Shaggy Ink Cap, *Coprinus comatus*. Its tall, narrow white caps are a familiar sight on disturbed land such as building sites or road verges. Some readers may be in the habit of cooking it, for it is good to eat when young, before the gills darken and the spores develop.

Travellers to the drier parts of the State often report having seen the same fungus, but in a completely desiccated condition. The fungus concerned is in fact *Podaxis pistillaris* (L. ex Pers.) Fries a type of stalked puff ball and at no stage of its development would one consider it for eating. On maturity the spore mass disintegrates into a soot-like powder instead of dissolving into an ink. In Miller and Farr's *An Index of the Common Fungi of North America* (1975) it is given the common name "Desert Coprinus", and this seems sufficiently appropriate for us to adopt. The modern view is that the similarity to a *Coprinus* does indicate relationship, and is not just a case of parallel evolution. Indeed, a number of our stalked puff balls are probably more closely related to certain mushrooms and toadstools than to each other.

Fig. 1.—Pair of young fruit bodies growing from side of a termite mound. Scale in cm. Photo: K.F. Kenneally

The Desert Coprinus is to be found in groups of individuals some 15 cm high. The groups often occur in bare areas which collect rainfall running off the sides of roads, especially in ironstone country. The absence of vegetation may make one wonder on what they can be living, as all fungi must have organic matter on which to grow. In fact, they will be found to be coming from the deserted nests of termites, for this species grows in association with them and cannot fruit while the ants are there and feeding on it. The black mass will be seen under the microscope to consist of egg-shaped spores measuring 10-16 μm long by 9-12 μm wide. Under the scanning electron microscope the egg-shape is seen to be more like that of a gumnut complete with apical ridge and basal stalk (Fig. 4).

Fig. 2.—Close up of the fruit bodies shown in Fig. 1. Photo: K.F. Kenneally

Mycologists have disagreed as to whether *Podaxis* consists of one of several species, as fruit body size and spore size can be so different between collections. Current opinion accepts one species, but recently (February 1979) a giant Desert Coprinus has been collected by one of us (Kenneally 7113 & 7118) at Mitchell Plateau (14°47'S, 125°48'E) in the N.W. Kimberley. It grows out from the side of active termite mounds of (?) *Eutermes* species, mounds that can be all of two metres tall. The mounds are mainly restricted to areas of black soil overlying basalt. Figure 1 shows a pair of young fruit bodies, the one on the right some 20 cm high and showing the "shaggy" cap so reminiscent of *Coprinus*. Figure 2 shows the two in close-up. Figure 3 shows the remains of a much larger specimen.

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Fig. 3.—The columella of a fully grown *Podaxis* that has shed its coat and spores. Note the cap-like end to the columella, and the height of 0.5 m. Photo: K.F. Kenneally

The largest fungus collected was 0.5m high and samples from it are now lodged as voucher specimens in the herbaria at the Royal Botanic Gardens, Kew, England, and at the Botany Department, University of Western Australia (Acc. No. UWA 2386). Although the fruit body itself is large, the spores are distinctly smaller than others collected or recorded in the literature, having a mean of 5.4 x 4.3 µm. Certainly no spore size so small is mentioned in Roger Heim's *Termites et Champignons* (1977) where 'Les Podaxons' are dealt with in Chapter 18.

Fig. 4.—Three spores of the Giant Desert Podaxis as seen under the scanning electron microscope. Note the scar at the base of the middle one, marking the position of the "stalk", and the rim at the opposite end so reminiscent of a gumnut. Within the rim lies a depression, the apical germ pore. The two spores on either side show this pore clearly. Photo: Dr John Kuo, Electron Microscopy Centre, U.W.A.

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AUTOGRAFTING OF ROOTS AND STEMS IN *EUCALYPTUS* AND OF RHIZOMES IN *NUYTSIA FLORIBUNDA*

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During routine inspection of the root systems of *Eucalyptus wandoo* at Wongamine Reserve, via Toodyay, several instances of root grafting were observed. The grafts were between laterals from the same plant (autografts) and close to the lignotuber. Fig. 1A shows two autografts with the bark removed, verifying the organic union between the wood of both roots, with the sapwood clearly running from one root to the other. Fig. 1B is an isolated instance of autografting of lateral stems of *Eucalyptus rudis*. The tree is located beside the Blackwood River, 14 km south-west of Nannup. The fusion seems to involve two nodes and four branches.

A chance inspection of the underground portion of a large tree of *Nuytsia floribunda* removed from a sandy swamp in the Perth suburb of Willetton, revealed grafting of a number of the root-like rhizomes (Fig. 2). At the points of fusion, the rings of vascular tissue ran around both rhizomes.

Fig. 1A.—Two autografts (arrows) of the lateral roots of *E. wandoo* at Wongamine Reserve. The ruler is in cm. The bark has been removed to show fusion of the wood.